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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/021,322	12/12/2001	Dong-su Park	29925/37976	6147

4743 7590 09/03/2003

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EXAMINER

NGUYEN, DONGHAI D

ART UNIT	PAPER NUMBER
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3729

DATE MAILED: 09/03/2003

5

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/021,322

Applicant(s)

PARK ET AL.

Examiner

Donghai D. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☒ Claim(s) 1-15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to under 37 CFR 1.83(a) because they fail to show "a semiconductor substrate 10" as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
2. Figures 1-5 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### *Specification*

3. The disclosure is objected to because of the following informalities: the phrase "PH<sub>3</sub>/He" (page 9, line 3) should be --PH<sub>3</sub>/H<sub>2</sub>--.

Appropriate correction is required.

### *Claim Objections*

4. Claims 1-15 are objected to because of the following informalities:

In claim 1, the phrase "the ground" (line 5) should be --a group-- and "oxynitride" (line 18) should be --oxy nitride--.

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There are many places in the claims the chemical symbols are used, such as "P" or "HF". The symbols need to be spelled out such as --phosphor-- or --hydrogen fluoride--.

Also, in claims 6 and 10 the unit in torr and ° C must follow all the represented number.

The Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phrase "nitrifying a surface of the tantalum oxynitride thin film" is vague and indefinite. It is unclear as to how a surface of the TaON thin film becomes a nitride layer.

The phrase "the gas" (claims 4, 5 and 7, line 2) is vague and indefinite. It is unclear which gases (i.e., the gas use in MPS formation or mixed gas uses in MPS doping process in claim 1) Applicants refer to.

The phrases "the evaporated tantalum ethylate" (claim 11, lines 2-3) and "the tantalum oxy nitride postprocessing" (claim 12, lines 2-3) lack antecedent basis. Also the phrase "the surface" (claim 12, line 4) is vague and indefinite. It is unclear which surface is nitrated (the surface of the lower electrode or the surface of the TaON film).

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

8. Claims 1-3 and 15 are rejected under 35 U.S.C. 102(a) as being anticipated by Applicants' admitted Prior Art.

Regarding claims 1-3 and 15, Applicants' admitted Prior Art (Pages 2-3) discloses all the claimed invention steps such as: forming a lower electrode (100) on a surface of a semiconductor substrate; forming Metastable Poly Silicon using gas after performing wet or dry etching of the lower electrode; performing Metastable Poly Silicon doping; depositing a nitride film (102) and a tantalum oxy nitride film (104); performing nitrating the surface of tantalum oxy nitride thin film; and forming an upper electrode (106), wherein the MPS formation, the MPS doping, the nitride depositing and the tantalum oxy nitride film depositing are performed in the chamber (inherence since the process using gas). Using HF for etching the lower electrode (page 2, line 25)

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 4, 9, 11-13, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants' admitted Prior Art in view of US Patent No. 6,340,622 B1 to Lee et al.

Prior Art discloses all the steps that recited in claims 4, 9, 11-13, and 15 except the material using in these step; However, Lee discloses the material: the gas comprising HF is selected from the group consisting of hydrogen fluoride/water (HF/H<sub>2</sub>O) (Lee's col. 4, lines 33-35); the nitride depositing using NH<sub>3</sub> gas and evaporated tantalum ethylate is the chemical vapor comprising tantalum (Lee's Col. 5, lines 7-17); the tantalum oxy nitride postprocessing is performed by nitrating the surface under NH<sub>3</sub> (or N<sub>2</sub>/H<sub>2</sub>) atmosphere or nitrifying the surface under N<sub>2</sub>O or O<sub>2</sub> atmosphere (Lee's col. 5, lines 29-33); the nitrating is performed at a temperature 200 °C to 600 °C by using plasma (Lee's col. 4, lines 13-21); and, the upper electrode is formed by depositing a material selected from the group consisting of poly silicon (Poly Si), titanium nitride (TiN), tantalum nitride (TaN), tungsten (W), tungsten nitride (WN), tungsten silicide (Wsi), ruthenium (RU), ruthenium oxide (RuO.sub.2), iridium (Ir), platinum (Pt), individually or repeatedly to form a stacking structure (Lee's col. 5, lines 45-49) for improving electrical characteristic and ensuring sufficient capacitance for next generation of semiconductor device (Col. 2, lines 31-35). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Applicants' admitted prior art to have all the specific material as taught by Lee et al for improving electrical characteristic and ensuring sufficient capacitance for the capacitor that uses in the next generation of semiconductor device.

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*Allowable Subject Matter*

11. Claims 5-8, and 10 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

*Conclusion*

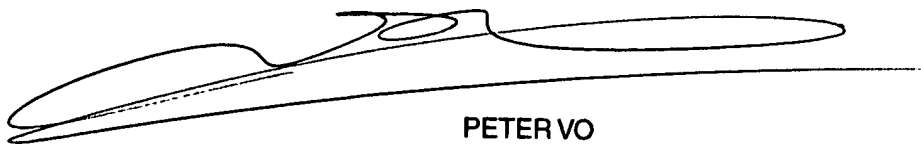
12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donghai D. Nguyen whose telephone number is (703) 305-7859. The examiner can normally be reached on Monday-Friday (9:00-6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter D. Vo can be reached on (703) 308-1789. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1148.

DN

A handwritten signature in black ink, appearing to read 'PETER VO', with a long horizontal line extending to the right.

PETER VO  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 3700